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ABSTRACT

This K-8 curriculum guide is intended to provide the direction and structure necessary for a unified mathematics curriculum. In addition, it is intended that this guide help raise the scores on the Georgia Criterion Referenced Test (CRT) and the Comprehensive Test for Basic Skills (CTBS). The guide contains: notes to the teacher; an explanation of coding system and priority levels; a list of mathematical skills by grade level, K-8; and tables of basic arithmetic facts. (MK)

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Savannah-Chatham Public School System

Mathematics Curriculum Guide

Grades K - 8

Revised
June, 1979

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INTRODUCTION

The Savannah-Chatham Public Schools Mathematics Curriculum Guide was written in an effort to rectify a situation which has resulted in a lessening of achievement and a lowering of scores on standardized tests by Chatham County students. It was written by a committee of educators with experience in the teaching of mathematics at all levels, kindergarten through college, and experience as curriculum and laboratory coordinators. In the development of the guide, the committee researched and previewed curriculum guides currently in use in Georgia schools and in other states. Among other resources were textbooks, scope and sequence charts, mathematics programs, and the objectives for the Georgia Criterion Referenced Test (CRT) and the Comprehensive Test for Basic Skills (CTBS). Local administrators, supervisors, specialists, and state department personnel were called upon as consultants.

The guide was field tested in 1978-79. All teachers, K-8, were asked to submit evaluations three times during the year. The evaluations were studied by the committee and the guide was revised in June, 1979, incorporating the teachers' suggestions, when appropriate.

The standardized tests given in Chatham County measure certain skills that have not been taught by the test dates and, in some cases, are not taught at all. To correct this, the skills, which are to be tested by the CRT and CTBS, have been written into this guide at a time **prior** to the test dates. Some skills which were not felt to be important at the elementary level were included because they are tested.

Another problem is the amount of material taught in the elementary grades. Due to the abundance of materials, some important skills have been deemphasized or omitted altogether. To correct this, the various skills have been given a priority rating. This priority rating is explained later in the guide.

There has been a lack of direction for the mathematics program in the system. A student who transfers, from one school to another within the Chatham County system, may encounter a different program with different standards and requirements. This guide will provide the direction and structure necessary for a unified mathematics curriculum. In addition, this guide should help raise the scores on the CRT and CTBS to meet or exceed state standards.

Revised:
June, 1979

Savannah, Georgia

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Notes to Teachers

1. Read **all** skills for the grade you are teaching as well as one year below and one year above.
2. The skills are listed in a natural teaching sequence. Follow this sequence whenever possible, **rather** than the sequence in the textbook.
3. Stress the learning of the addition, subtraction, multiplication and division **facts**.
4. Stress adding, subtracting, multiplying and dividing.
5. Certain skills as stated contain two or more related parts which may not be needed at the same time. Introduce them when they occur in the teaching sequence. (example, a third grade skill reads "recognize and properly use the symbols +, -, x, ÷, >, <, =, ¬, $, ¢, and ( )." Introduce the plus (+) sign when adding, the minus (-) sign when subtracting, etc.)
6. Use mathematically **accurate** terms. (for example, sum, product, difference and quotient--not just **answer**)
7. Use synonymous terms interchangeably, (for example, renaming regrouping, and borrowing; quarter after and 15 min. past) so the student will know a variety of terms he may encounter. However, do not use terms interchangeably which are not the same, such as **number, numeral** and **digit**.
8. You should determine the instructional level of the student and endeavor to bring him to his present grade level.
9. Statements in parenthesis following the skills are notes to the teacher--not skills for the students.
10. A **cumulative progress chart,** to be used for each student, has been devised to show the achievement of mathematical skills, kindergarten, through eighth grade. **The chart will be encoded yearly and kept as part of the student's permanent record**. This cumulative record will enable the receiving teacher to determine the instructional level of each student. Instructions for encoding are printed on the cumulative record chart.
11. In the course of the development of mathematics, certain procedures for computations have been developed. These methods are called algorithms, and several algorithms have been developed for each of the different operations. In general, however, one algorithm is the most efficient. Currently, in the public school system, too many students are not learning these basic algorithms. With the new math came a barrage of new teaching aids designed to help students understand how and why these algorithms work. Many teachers mistakenly believed that these were to be taught as replacements for the time-proven algorithms and students were required to use them. Students should have been required to abandon these aids in favor of the efficient algorithms as soon as they understood how an operation worked. The best example of this is division. The algorithms used by most, if not all, mathematicians is called simply "long division." This is a difficult process for a child first learning division, so teachers us other methods to instruct their students, most notably, the subtraction method. There is nothing wrong with using the subtraction method as a teaching aid. In fact, teachers should use every method at their disposal to explain how the division process works. However, children are not being taught to discard these other methods, even though these methods entail more work. Therefore, **teachers will be expected to instruct students in choosing the efficient algorithms used for a particular operation and to abandon all other methods**.

Explanation of the Coding System and Priority Levels

Each skill on the list has two codes; a single letter which precedes the skill, and a combination of numbers and a letter which follows the skill.

Preceding the statement of the skill is one of the following letters; **I, E. R.** The letter **I** indicates that the skill is **introduced** at that grade level. The letter **E** indicates the **expansion** of a skill introduced at an earlier grade level. For example, addition will be expanded from adding without regrouping to include adding with regrouping. The letter **R** indicates the **reinforcement** of a skill previously introduced, and perhaps previously mastered.

An explanation of the levels **A, B,** and **C** is as follows.

The **A level skills** are vital life skills, necessary mathematical skills, or skills heavily tested by the CRT and CTBS. **These skills should be mastered by the indicated grade level and must be mastered by the end of the eighth grade**. Certain skills are marked with an asterisk (*). This indicates that a student should demonstrate a mastery **by achieving a 99% accuracy**. These skills include an immediate recall of the addition, subtraction, multiplication, and division facts. For the other **A** level skills, a student will demonstrate mastery by achieving an 80% accuracy.

The **B level skills** are important mathematical skills which are tested by the CRT and CTBS, but to a lesser degree than the **A** level skills. The student should demonstrate mastery by achieving 70% accuracy at the indicated grade level.

The **C level skills** are enrichment skills for most students. However, for the advanced students these skills are necessary for success in advanced courses.

For the majority of the students these skills may be touched briefly, but not emphaisized until after **A** and **B** level skills are mastered. The **C** level skills are tested by the CRT and CTBS, but to a lesser degree than the **A** and **B** level skills. Therefore, emphasizing **A** and **B** level skills will not lower a student's overall score on these tests.

Following the statement of each skill is a coding which shows the **Grade of Introduction-Priority Level-Grade of Mastery**. For example, 3-A-5 means that the skill is a third grade skill, it is an **A** level skill, and it should be mastered by the end of the fifth grade. The code **5-C** means that the skill is a 5th grade skill, it is a **C** level skill, and that mastery is not required. A skill introduced at the B or C level may be raised at a higher grade to the A or B level. However, the priority level may never be lowered. When a skill is expanded or its priority raised, the grade of mastery may also be changed. For example, subtracting fractions with like denominators is a third grade **B level** skill to be mastered in the fourth grade. By the fifth grade, it is an **A** level skill to be mastered in the fifth grade.

KINDERGARTEN SKILLS

(1)	count the objects in a set. (1-10)	A
(2)	state the number of objects in a set. (1-10)	A
(3)	write the numeral for objects in a set. (1-10)	B
(4)	show appropriate number of objects for a given numeral.	A
(5)	recognize equivalent and non-equivalent sets.	B
(6)	select the larger or smaller of two sets or two numbers.	A
(7)	add two sets of objects with sums no larger than 10.	B
(8)	add two numbers with sums no larger than 10.	B
(9)	substract two sets of objects the larger of which is no greater than 10.	C
(10)	recognize, name, and properly use the symbols: +, and =.	
(11)	recognize coins. (penny, nickel, dime)	B
(12)	state the value of coins. (penny, nickel, dime)	B
(13)	identify instruments of measure and what they measure. (clock, scales, thermometer, calendar)	C
(14)	identify an object as a circle, square, triangle and rectangle.	B
(15)	select from a group of objects, an object which is the same (or different) as a given object.	B
(16)	demonstrate the meaning of spatial relation to include the following: next, last, near, far, above, below, middle, over, under, top, bottom, between, inside, outside, on, same, alike, pair, different, center, around, left, right, higher, lower, up and down	A

FIRST GRADE SKILLS

The pupil should be able to:

I	(1)	count the objects in a set, state the number, and write the numeral. (1-100)	1-A-2*
I	(2)	show appropriate number of objects for a given numeral. (1-100	1-A-2
I	(3)	demonstrate the meaning of spatial relations to include the following: next, last, near, far, above, below, over, middle, under, top, bottom, between, inside, outside, on, same, alike, pair, different, center, around, left, right, higher, lower, up, and down	1-A-3
I	(4)	recognize equivalent, non-equivalent, and empty area sets.	1-A-1
I	(5)	properly use zero as a number.	1-A-1
I	(6)	give a number which corresponds to a point on the number line. (0-9)	1-A-1
I	(7)	locate a given number on a number line. (0-9)	1-A-1
I	(8)	select the larger or smaller of two sets or two numbers. (sets to 10 and numbers to 100)	1-A-1
I	(9)	select the largest or smallest of three or more sets or numbers. (sets to 10 and numbers to 100)	1-B-2
I	(10)	associate ordinal numbers with positions. (1-5)	1-A-1*
I	(11)	use the number line to illustrate the addition and subtraction facts.	1-A-1
I	(12)	add objects and numbers with sums up to 20.	1-A-1
I	(13)	recognize, name and properly use the symbols: +, -, =, <, >, and ≠.	1-A-2
I	(14)	subtract objects and numbers, the larger of which is no greater than 20	1-A-2
I	(15)	demonstrate a rapid recall of the addition facts. (from 0 + 0 to 10 + 10)	1-A-2*
I	(16)	demonstrate a rapid recall of the subtraction facts. (minuends up to 20 and subtrahends up to 10)	1-A-3*
I	(17)	supply the missing number in a number sentence.	1-A-2
I	(18)	add two 2-digit numbers with no renaming.	1-A-2
I	(19)	subtract 2-digit numbers with no renaming.	1-A-2

I (20) count by fives and tens to 100. 1-B-2

I (21) recognize and name place values (ones and tens). 1-A-2

I (22) identify the missing element in a sequence or table. 1-C

I (23) recognize and name coins, their values, and the value of combinations: (1, 5, 10, 25, 50). 1-A-3

I (24) tell time to the nearest hour and half-hour. 1-A-2

I (25) demonstrate his knowledge of the organization of calendar (days, weeks, months, year). 1-B-4

I (26) compare length of objects: (>, <, same). 1-B-2

I (27) compare weights of objects: (>, <, or same). 1-C

I (28) use improvised and standard units to determine length of objects: (in., cm.). 1-C

I (29) use improvised and standard units to determine weight of objects: (lb., kg.) 1-C

I (30) identify, from models, the fractional parts (halves, thirds, and fourths) in relation to the whole. 1-C

I (31) select the appropriate operation and solve simple word problems using addition and subtraction facts. 1-C

I (32) distinguish between open and closed curves. 1-C

I (33) recognize and name circles, rectangles, squares, and triangles. 1-C

I (34) sort geometric figures according to shape and size.

SECOND GRADE SKILLS

The pupil should be able to:

R (1) count the objects in a set, state the number and write the numeral. (1-100) 1-A-2*

R (2) show appropriate number of objects for a given numeral (1-100). 1-A-2

R (3) demonstrate the meaning of a spatial relations to include the following: next last, near, far, above, below, middle, over, under, top, bottom, between, inside, outside, on, same, alike, pair, different, center, around, left, right, higher, lower, up, and down. 1-A-3

R (4) recognize equivalent, non-equivalent, and empty sets. 1-A-1

R (5) properly use zero as a number. 1-A-1

R (6) select the larger or smaller of two sets or two numbers: (sets to 10; numbers to 100). 1-A-1

R (7) select the largest or smallest of three or more sets or numbers: (sets to 10; numbers to 100). 1-A-2

E (8) demonstrate the one-to-one correspondence of numbers and points on the number line: (0-100) 1-A-2

E (9) read and write ordinal numbers and associate them with their positions on the number line. (1-10) 1-A-2*

R (10) use the number line to illustrate the addition and subtraction facts. 1-A-3

E (11) recognize, name, and properly use the symbols. $, X, ( ), -, +, =, >, <, ¢. 1-A-2

E (12) add 3 or more one-digit numbers 1-A-1

R (13) demonstrate a rapid recall of the addition facts. 1-A-2*

E (14) add all combinations of two numbers, having up to three digits without renaming: 1-A-2

75	78	275	243	243
+4	+21	+ 3	+26	+154

R (15) subtract objects and numbers the larger of which is no greater than 20. 1-A-2

R (16) demonstrate a rapid recall of the subtraction facts. 1-A-3*

R (17) supply a missing number in a number sentence. 1-A-2

E (18) subtract all possible combinations of one, two, and three digit numbers without renaming: 1-A-2

17	36	272	354	697
-3	-15	- 1	-23	-233

E (19) select appropriate operation and solve word problems using addition, subtraction. 1-A-8

E (20) identify and name the place value of any digit in any numeral: (1-999). 1-A-2

I (21) add all combinations of one, two and three-digit numbers with renaming: 2-A-3

25	25	254	255	256
+6	+87	+ 7	+56	+268

I (22) subtract all possible combinations of one, two and three-digit numbers with renaming: 2-A-3

63	63	126	126	226
- 8	-35	- 8	-38	-198

I (23) use the zero in all positions of addition and subtraction. 2-A-4

E (24) count by twos, threes, fives, and tens. 1-B-3

I (25) distinguish between odd and even numbers. 2-B-3

E (26) place in order numbers less than 1000. 1-A-2

I (27) write numerals in standard and expanded form (1-999). 2-B-3

E (28) identify the missing elements in a table or sequence when given a rule. 1-C

I (29) give the rule indicated by the elements in a table or sequence when given a table or sequence. (guess my rule) 2-C

I (30) demonstrate a knowledge of the number relations in the commutative (order) and associative (grouping) properties of addition. (names not be stressed) 2-C

E (31) recognize currency and coins and give correct change from $1.00. 1-A-3

E (32) tell time in 5 min. intervals (stress term "quarter til" or "quarter after" and "half-past"). 1-A-3

E (33) demonstrate a knowledge of the organization of the calendar. (days, weeks, months, years) 1-B-4

E (34) compare lengths of objects: (>, <, =) 1-B-2

R (35) compare weights of objects: (>, <, =) 1-C

I (36) compare volume of objects: (>, <, =) 2-C

I (37) identify and name the basic units of measure both U.S. Customary System and Metric system: (in-ft, cm-m, oz-lb, kg-g, l, pt-qt-gal) 2-C

I (38) select the appropriate unit to measure common objects: (yd, ft, in, lb, oz, gal, qt, pt, m, cm, kg, g, l). 2-C

E (39) measure to the nearest whole unit the length, weight or volume of familiar objects. 1-C

E (40) read, write, and demonstrate fractional parts: (½, 2/2, ⅓, ⅔, 3/3, ¼, 2/4, ¾, 4/4). 1-C

E (41) identify, demonstrate, and name: line point, ray, segment, triangle, square, rectangle, circle, solids (box, can, tent, ball), open and closed curves. (**geometric terms need not be stressed**) 1-C

R (42) sort geometric figures according to shape and size. 1-C

I (43) find information using bar graphs, picture graphs, and circle graphs. 2-C

THIRD GRADE SKILLS

The pupil should be able to:

E (1) count by twos, threes, fives, tens, fifties and hundreds 1-B-3

R (2) demonstrate the meaning of spatial relations to include the following: next, last, near, far, above, below, middle, over, under top, bottom, between, inside, outside, on, same, alike, pair, different, center, around, left, right, higher, lower, up and down. 1-A-3

E (3) recognize equivalent sets, non-equivalent sets, empty sets, and subsets. 1-A-3

E (4) read and write numbers in both Arabic symbols and words through 999999. 1-A-3

E (5) give the place name for the digits in any number less than one million. 1-A-3

E (6) recognize, name, and properly use the symbols: $, X, ( ), +, -, =, <, >, ¢, ÷, √. 1-A-3

R (7) use the number line to illustrate the addition and subtraction facts. 1-A-3

R (8) demonstrate a rapid recall of the addition facts. 1-A-3*

R (9) demonstrate a rapid recall of the subtraction facts. 1-A-3*

I (10) check accuracy of answers to problem: addition by re-adding in different order, subtraction by addition, multiplication by interchanging multiplier and multiplicand, division by multiplication. 3-A-4

E (11) properly use **zero** and **one** in addition, subtraction, multiplication, and division. (stress division by 0 is impossible) 1-A-4

E (12) add all combinations of numbers with up to four digits without renaming. 1-A-3

E (13) subtract all possible combinations of numbers with up to four digits without renaming. 1-A-3

E (14) add all combinations of numbers with up to four digits with renaming. 2-A-3

E (15) subtract all possible combinations of numbers with up to four digits with renaming, with emphasis on zeroes in minuend. 2-A-4

E (16) select proper operations and solve word problems involving +, -, X, ÷, fractions, measurement and money. 1-A-8

E (17) rewrite horizontal addition and subtraction problems in proper vertical alignment. 3-A-3

I (18) recognize addition and subtraction as inverse operations. 3-A-3

I (19) demonstrate a rapid recall of the multiplication facts. (0-10) 3-A-4*

I (20) demonstrate a rapid recall of the division facts. 3-A-5*

I (21) express division problem in three forms. 3-A-4

E (22) demonstrate a knowledge of the number relations in the commutative and associative properties of addition and multiplication. (order and grouping 2-C

R (23) supply the missing element(s) in a number sentence. 1-A-2

R (24) identify even and odd numbers. 2-B-3

E (25) identify the order relation of numbers 999999. 1-A-3

E (26) read, write, and associate ordinal numbers with positions. 1-A-3*

E (27) read and write a number in expanded and standard form (999999)/(convert from one form to another). 2-B-4

I (28) round numbers to tens and hundreds. 3-B-3

I (29) estimate the answers to a problem. 3-B-6

E (30) supply the missing number in a table or sequence. 1-B-4

E (31) give the rule indicated by the elements in a table or sequence. (guess my rule) 2-C

I (32) multiply two and three digit numbers by a one-digit number without renaming. 3-A-3

I (33) multiply two and three digit numbers by a one-digit number with renaming. 3-A-3

I (34) divide two and three digit numbers by a one-digit number, with and without remainders. 3-A-4

I (35) supply the missing elements in an equation illustrating the distributive property of multiplication over addition. 3-C

I (36) read, write, and demonstrate fractional parts. 1-B-3

I (37) identify the order relation of fractions with like denominators up to 6/6. 3-B-4

I (38) identify equivalent fractions from visual representation. 3-C

I (39) add fractions with like denominators. 3-B-4

I (40) subtract fractions with like denominators 3-B-4

E (41) recognize and name standard U.S. currency through $10. 1-A-3

E (42) determine value of combinations of coins and currency (all coins and currency thru $10) and select coin and currency combinations for a given value. 1-A-4

I (43) round amounts of money to nearest dollar or dime 3-A-4

E (44) make the proper change for any purchase less than $10. 2-A-4

E (45) tell time to the nearest minute and write it in digital form. (use terms quarter til, half-past, and quarter past) 1-A-3

E (46) demonstrate a knowledge of the organization of the calendar. (days, weeks, months, years) 1-B-4

E (47) use the calendar properly to determine days and dates, and the date of a day, a given number of days before or after a given date. 1-B-4

I (48) determine the temperature to nearest degree using both Fahrenheit and Celsius scales. 3-C

I (49) relate activities and comfort levels to thermometer readings. 3-C

E (50) select the appropriate unit for measuring common objects. (use yd., ft., in., m, cm, kg, g, lb., oz.) 2-B-4

E (51) measure length to nearest yard, foot, inch, half-inch, quarter-inch, meter, centimeter. 1-B-4

E (52) determine the volume of common containers to the nearest liter, ½ liter, ¼ liter, gal., ½ gal., qt., ½ qt., pt., ½ pt., emphasize **whole** units). 3-B-4

E (53) determine the weight of common objects to the nearest lb., oz., kg., g. 3-B-4

I (54) convert one unit to another **within** the U.S. Customary System and convert one unit to another **within** the Metric System. (stress use of metric prefixes, symbols, and abbreviations kilo, hecto, centi, milli) 3-B-5

I (55) estimate (guess) the length, weight, and volume of common objects. 3-C

E (56) identify and name points, lines, rays, segments, angles, triangles, squares, rectangles, circles, open curves, closed curves, cubes, spheres, cylinders. 1-C

E (57) recognize and name the following parts of a circle: center, radius, diameter. 1-C

I (58) determine if a figure is symmetrical and show the line(s) of symmetry. 3-C

E (59) sort and classify objects by similarities or differences. 1-B-4

I (60) identify the coordinates for a point on a grid, and locate the point on a grid which corresponds to a given number pair. 3-C

E (61) find information using bar, picture and circle graphs. 2-C

I (62) solve problems using information shown in a bar or picture graph. 3-C

I (63) determine the probability of an event from up to four equally likely outcomes. 3-C

FOURTH GRADE SKILLS

The pupil should be able to:

E (1) count by twos, threes, fives, tens, twenties, fifties and hundreds. 1-B-4

R	(2) read and write numbers up to one million, both in Arabic symbols and words.	1-A-3	
R	(3) give the place value name for each digit in any number through one million.	1-A-3	
E	(4) recognize and properly use the symbols: +, -, x, ÷, ., >, <, =, ⌐, $, ¢, ( ).	1-A-4	
R	(5) demonstrate a rapid recall of the addition and subtraction facts.	1-A-3*	
E	(6) use the number line to illustrate simple equations.	1-A-4	
R	(7) properly use **zero** and **one** in addition, subtraction, multiplication, and division. (stress division by 0 is impossible)	1-A-4	
E	(8) add and subtract numbers containing one to six digits, without and with renaming. (place emphasis on numbers with zero(s) in the minuend)	1-A-4	
R	(9) rewrite horizontal addition and subtraction problems in the proper vertical alignment.	3-A-3	
R	(10) recognize addition and subtraction as inverse operations.	3-A-3	
R	(11) demonstrate a rapid recall of the multiplication and division facts.	3-A-5*	
R	(12) express division problems in three forms ($2\overline{)6}$, 6 ÷ 2, 6/2)	3-A-4	
E	(13) select appropriate operations and apply them in the correct order to solve word problems.	1-A-8	
R	(14) check accuracy of answers to problems. (addition by re-adding in a different order, subtraction by addition, multiplication by interchanging multiplier and multiplicand, division by multiplication)	3-A-4	
I	(15) recognize multiplication and division as inverse operations.	4-A-4	
E	(16) supply the missing number in a number sentence.	1-A-4	
R	(17) demonstrate a knowledge of the number relations in the commutative and associative properties of addition and multiplication.(order and grouping)	2-C	
R	(18) identify even and odd numbers.	2-B-3	
R	(19) identify the order relation of numbers through one million.	1-A-3	
R	(20) read, write, and associate ordinal numbers with their positions on the number line.	1-A-3*	
R	(21) read and write numbers in expanded and standard form. (convert from one form to another)	2-B-4	
E	(22) round numbers to tens, hundreds, thousands, and ten thousands.	3-B-4	
E	(23) supply the missing number in a sequence.	1-B-4	
E	(24) give the rule indicated by the elements in a table or sequence.	2-C	
R	(25) estimate the answer to a problem using rounded numbers in order to determine if the answer is reasonable.	3-B-6	
E	(26) multiply a three-digit number by a three digit number. (place emphasis on numbers containing zero)	3-A-5	
R	(27) divide two-digit and three-digit numbers by a one-digit divisor with and without remainders.	3-A-4	
E	(28) divide by two-digit divisors with and without remainders. (stress trial division)	3-A-5	
R	(29) supply the missing elements in an equation illustrating the distributive property of multiplication over addition.	3-C	
I	(30) properly use zero as a place holder in quotients.	4-A-6	
I	(31) multiply by 10, 100, and 1,000 using short form. (annexation of zero)	4-A-4	
I	(32) divide numbers ending in 0 by 10 using short method. (striking out final 0)	4-A-4	
E	(33) read, write, and demonstrate fractional parts.	1-B-4	
E	(34) identify the order relation of fractions and mixed numbers with denominators up to 10.	3-A-5	
I	(35) write a given fraction as an equivalent fraction with both larger and smaller (where possible) denominators.($\frac{1}{2}$ = 2/4 = 3/6; stress: 1 = 1/1, = 2/2, = 4/4, etc. and 5 = 5/1, 6 = 6/1, etc.)	4-A-5	
I	(36) reduce fractions to lowest possible terms. (simplify)	4-A-5	
I	(37) convert mixed numbers to improper fractions and improper fractions to mixed numbers in lowest terms.	4-A-5	
E	(38) add and subtract fractions with like and unlike denominators.	3-B-5	
I	(39) add and subtract mixed numbers with like denominators.	4-B-4	
I	(40) express names of numbers in various ways. (whole numbers, fractions and decimals)	4-B-5	
E	(41) recognize and name U.S. coins and currency through $100; determine value of combinations and make change for purchases up to $100.	1-A-4	
R	(42) round amounts of money to the nearest dollar or nearest dime.	3-A-4	

I (43) convert the common fractions 1/100, 1/10, ¼, ½, ¾ to decimal fractions and vice versa. (use money as teaching aid) 4-A-4

E (44) tell time to the nearest minute, write it in digital notation, A.M. and P.M. and do calculations involving time. 1-A-4

R (45) demonstrate a knowledge of the organization of the calendar. (days, weeks, months, year) 1-A-4

I (46) convert from small to large or large to small time units, including seconds, minutes, hours, days, weeks, months, years, decades, and centuries. 4-A-5

R (47) use the calendar properly to determine days and dates. 1-B-4

R (48) determine temperature to the nearest degree using Fahrenheit and Celsius scales. 3-C

R (49) relate activities and comfort levels to thermometer readings. 3-C

R (50) select the appropriate unit to measure common objects. (in., ft., yd., cm, m, km, oz, lb., ton, g, kg, metric ton, oz., pt., qt., gal., ml, liter, kl) 2-B-4

E (51) measure length to the nearest yd., ft., in., half-in., eighth-in., cm. 1-5-4

R (52) measure volume to the nearest gal., ½ gal., qt., ½ qt., pt., ½ pt., liter, ½ liter. 3-B-4

R (53) measure weight to the nearest lb., oz., g, kg. 3-B-4

R (54) convert one unit to another **within** the U.S. Customary System and convert from one unit to another **within** the Metric System. (stress use of prefixes: kilo, hecto, deka, deci, centi, milli, and their values) 3-B-5

R (55) estimate (guess) the length, weight, and volume of common objects. 3-C

E (56) identify and name point, line, line segment, ray, angle and its parts, triangle, right triangle, equilateral triangle, square, rectangle, circle and its parts, open curve, closed curve, pyramid, prism, sphere, cylinder, polygon. 1-B-4

I (57) state the relation between points and geometric figures, or between geometric figures (inside of, outside of, parallel to, perpendicular to, adjacent to.) 4-B-4

I (58) determine the perimeter of a polygon. 4-B-4

I (59) determine the area of a figure in terms of square units (blocks) and the volume of a figure using cubic units (blocks and models only). 4-B-4

R (60) determine if a figure is symmetrical and, if so, show its line(s) of symmetry. 3-C

I (61) select from given geometric shapes, a shape which matches one that has been turned around, flipped over, moved sideways, stretched, or shrunk. 4-C

E (62) sort and classify objects by similarities or differences. 1-B-4

I (63) list the ordered pairs in a relation as determined by a given rule. 4-C

I (64) find the rule which relates the items in each ordered pair of a relation. (guess my rule). 4-C

E (65) identify the coordinates for a point on a grid, and locate the point on a grid which corresponds to a given number pair. 3-C

I (66) make diagrams, tables, and graphs to represent relations. (sets of ordered pairs) 4-C

I (67) express any number through one hundred in Roman numerals. 4-C

R (68) find information using bar, picture, and circle graphs. 2-B-4

I (69) collect data, put it into a chart or a table, and represent it in a graph. 4-B-4

R (70) solve problems using information shown in a bar, picture or circle graph. 3-B-4

I (71) determine the possible outcomes of an experiment. (e.g. rolling a die, tossing a coin) 4-C

R (72) specify which of a given set of outcomes is more likely, less likely, or equally likely to occur. 4-C

FIFTH GRADE SKILLS

The pupil should be able to:

E (1) read and write numbers in both Arabic symbols and words through one-billion. 1-A-5

R (2) properly use **zero** and **one** in the 4 basic operations. 1-A-4

E (3) recognize and properly use the symbols: +, -, x, ÷, ., $\sqrt{}$, =, <, >, ≠, $, ¢, ∪, ∩, ( ). 1-A-5

E (4) add columns of two or more numbers containing 1 to 7 digits. (use numbers of various lengths in same column) 1-A-5

E (5) rewrite horizontal problems in vertical form with proper alignment. (stress decimal number problems) 3-A-6

E (6) subtract numbers containing 1 to 7 digits. (emphasis on numbers contain-

		ing zeroes in the minuend and numbers with minuends having more digits than subtrahend)	1-A-5
R	(7)	recognize addition and subtraction as inverse operations.	4-A-4
E	(8)	select the appropriate operations and apply them in the correct order to solve word problems.	1-A-8
E	(9)	check the accuracy of answers to problems. (addition by re-adding, subtraction by adding, multiplication by interchanging multiplicand and multiplier, division by multiplication)	3-A-6
R	(10)	demonstrate a rapid recall of the multiplication and division facts.	3-A-5*
R	(11)	supply the missing number in a number sentence.	1-A-4
R	(12)	demonstrate knowledge of the number relations in the commutative, associative, and distributive properties. (order and grouping)	2-C
E	(13)	round numbers to nearest hundredth, tenth, unit, ten, hundred, thousand, or million, and money amount to nearest dime or dollar.	3-B-5
R	(14)	supply the missing number in a sequence or table.	1-B-4
R	(15)	give the rule indicated by the elements in a sequence or table.	2-C
R	(16)	estimate the answer to problems using rounded numbers to determine if the answer is reasonable.	3-B-6
E	(17)	multiply numbers having up to 5 digit multiplicands and 3 digit multipliers. (emphasis on numbers containing zeroes)	3-A-5
E	(18)	divide one and two digit divisors into 3, 4, and 5 digit dividends. (with and without remainders)	3-A-5
R	(19)	properly use zero as a place holder in quotients.	3-A-6
E	(20)	multiply and divide by 10, 100, and 1000 using the short method. (annexation or striking out zeros)	4-A-5
E	(21)	express a division problem in 3 forms. ($2\overline{)1}$, $1 \div 2$, and $\frac{1}{2}$)	3-A-5
R	(22)	recognize multiplication and division as inverse operations.	4-A-4
I	(23)	properly use most efficient method (algorithm) to work addition, subtraction, multiplication, and division problems. (note: student now omits rows of zeroes, expanded form and other aids)	5-A-6
I	(24)	determine if a number can be divided by 2, 5, or 10 using the divisibility tests.	5-B-5
I	(25)	find all of the factors of any composite number through 100.	5-B-8
I	(26)	determine if any number less than 100 is prime or composite.	5-B-8
I	(27)	give the prime factorization of any composite number through 100.	5-B-8
I	(28)	find the least common multiple and greatest common factor of any two numbers through 100.	5-B-5
E	(29)	identify the order relation of fractions and mixed numbers with denominators up to 12.	3-A-5
R	(30)	write a given fraction as an equivalent fraction with both larger and smaller (where possible) denominators: $\frac{1}{2} = 2/4 = 3/6$, $1 = 1/1 = 2/2 = 3/3, = 4/4$ etc...and $5 = 5/1$, $6 = 6/1$, etc...)	4-A-5
R	(31)	reduce a fraction to its lowest possible terms. (simplify)	4-A-5
R	(32)	convert mixed numbers to improper fractions and improper fractions to mixed numbers in lowest terms.	4-A-5
E	(33)	add and subtract proper fractions with like and unlike denominators.	3-A-5
E	(34)	add and subtract mixed numbers with like and unlike denominators without and with regrouping.	4-A-6
I	(35)	multiply two proper fractions and multiply a proper fraction with a whole number.	5-A-6
I	(36)	multiply two or more mixed numbers using the short cut or cancellation method.	5-A-6
E	(37)	express names of numbers in various ways. (whole numbers, fractions and decimals)	4-B-5
E	(38)	recognize and name U.S. coins and currency, determine value of combinations of currency and coins, and make change for purchases.	1-A-5
R	(39)	round amounts of money to nearest dollar or dime	3-A-4
E	(40)	change any proper fraction with a denominator of 10, 100, or 1000 to a decimal fraction and vice versa.	4-A-5
I	(41)	read and write decimal fractions through thousandths.	5-A-6
E	(42)	give the place value of every digit in any number form one-thousandth to one hundred billion. (.001 to 100,000,000,000)	1-A-5
E	(43)	change any proper fraction with a denominator of 2, 4, 5, 20, 25, 50, to a decimal fraction. (use equivalent fractions: $\frac{1}{2} = 5/10 = .5$)	4-A-6

I (44) add decimal numbers with sums less than one. 5-A-5

I (45) subtract decimal numbers with minuends less than one. 5-A-5

I (46) add decimal numbers with sums greater than one. 5-A-5

I (47) subtract decimal numbers with minuends larger than one and subtrahend both less than and greater than one. 5-A-5

R (48) tell time to the nearest minute, write it in digital notation, distinguish between A.M. and P.M., and do calculations involving time. 1-A-4

R (49) convert from small to large or large to small time units including seconds, minutes, hours, days, weeks, months, years, decades, centuries. 4-A-5

R (50) use the calendar correctly to determine days and dates. 1-B-4

R (51) determine temperature to the nearest degree using Fahrenheit and Celsius scales. 3-C

R (52) relate activities and comfort levels to thermometer readings. 3-C

E (53) select the appropriate unit to measure common objects. (mi., yd., ft., in., km, m, cm, mm, ton, lb., oz., metric, ton, kg, g, gal., qt., pt., kl, l, ml) 2-A-5

E (54) measure length to the nearest yd., ft., in., ½ in., ¼ in., 1/8 in., 1/10 in., m, cm, or mm. 4-A-5

E (55) measure volume to the nearest gal., ½ gal., qt., ½ qt., pt., ½ pt., oz., l, ½ l, ¼ l, ml. 3-A-5

R (56) measure weight to the nearest lb., oz., kg, g. 3-A-5

R (57) convert one unit to another **within** the U.S. Customary System and convert one unit to another **within** the Metric System. (stress use of prefixes kilo, hecto, deka, deci, centi, milli, and the relative values) 3-A-5

R (58) estimate (guess) length, weight, volume of common objects. (this skill needs to be taught, but it may **never** be mastered) 3-B

E (59) recognize, identify, and name points, lines, line segments, rays, angles and their parts, triangles and their parts, right triangle, equilateral triangle, squares, rectangles, circles and their parts, open curves, closed curves, cubes, pyramids, prisms, spheres, cylinders, polygons, pentagons, hexagons, quadrilaterals, parallelograms, trapezoids, rhombuses. 1-B-5

E (60) state the relation between points and geometric figures, or between geometrics figures (inside of, outside of, parallel to, perpendicular to, intersecting, adjacent to) 4-B-4

R (61) select from given geometric shapes a shape which matches one that has turned around, flipped over, moved sideways, stretched, or shrunk. 4-C

E (62) find the perimeter of a polygon. (use formula for square and rectangle) 4-B-6

E (63) determine the area of squares, rectangles, and right triangles. 4-B-6

I (64) find the volume of rectangular prisms. 5-B-6

I (65) measure any angle up to 180° using a protractor. 5-B-5

R (66) sort and classify objects by similarities or differences. 1-B-4

R (67) list the ordered pairs in a relation as determined by a given rule. 4-C

R (68) find the rule which relates the terms in each ordered pair of a relation (guess my rule). 4-C

R (69) identify the coordinates for a point on a grid, and locate the point on a grid which corresponds to a given pair. 3-C

I (70) identify the union of two sets. 5-C

I (71) identify the intersection of two sets. 5-C

R (72) make diagrams, tables, and graphs to represent relations. (sets of ordered pairs) 4-C

E (73) read and write Roman numerals to one thousand. 4-C

R (74) find information using bar, picture, and circle graphs. 2-B-4

R (75) collect data, put it into charts or tables, and represent it in a graph. 4-B-4

R (76) determine the possible outcomes of an experiment. (e.g. rolling a die, tossing a coin) 4-C

R (77) specify which of a given set of outcomes is more likely, less likely, or equally likely to occur. 4-C

I (78) find the mean, median, mode and range of data. 5-C

SIXTH GRADE SKILLS

The pupil should be able to:

E (1) read and write numbers in both Arabic symbols and words through one trillion. 1-A-6

R (2) properly use **zero** and **one** in the four basic operations. 1-A-4

E (3) recognize and properly use the symbols: +, -, x, ÷, .., $\sqrt{\ }$, =, <, >, $, ¢, •, %, ∪, ∩, $\sqrt{\ }$, ( ). 1-A-6

E (4) rewrite horizontal problems in vertical form with proper alignment. (stress decimal number problems) 3-A-6

E (5) add and subtract any whole numbers. 1-A-6

E (6) select the appropriate operation and apply them in the correct order to solve word problems. 1-A-8

R (7) check accuracy of answers to problems. (addition by re-adding, subtraction by adding, multiplication by interchanging multiplicand and multiplier, division by multiplication) 3-A-6

R (8) demonstrate a rapid recall of the multiplication and division facts. 3-A-5*

R (9) demonstrate a knowledge of the number relations in the commutative, associative, and distributive properties. (order and grouping) 2-C

R (10) supply the missing number in a number sentence. 1-A-4

E (11) round any number to any specified place value. 3-B-6

R (12) estimate the answers to problems using rounded numbers to determine if the answer is reasonable. 3-B-6

E (13) determine if a number can be divided by 2, 3, 5, or 10, using the divisibility tests. 5-B-6

E (14) identify prime and composite numbers and give the prime factorization of any number. 5-B-8

R (15) supply the missing element in a sequence or table and determine the rule indicated by the elements in a sequence or table. 2-C

E (16) multiply any whole numbers. 3-A-6

I (17) use exponents to show the powers of 10. 6-B-8

I (18) square and cube whole numbers by use of exponential form. 6-B-8

I (19) find the square root of any whole number which is a perfect square through 225. 6-B-8

R (20) recognize inverse operations. 2-A-4

E (21) divide by one, two, or three digit divisors with and without remainders. 3-A-6

R (22) express a division problem in 3 forms. ($2\overline{)1}$, 1÷2, and ½) 3-A-5

R (23) properly use zero as a place holder in quotients. 3-A-6

R (24) properly use most efficient method (algorithm) to work +, -, x, ÷ problems. (students now omits rows of zeros, expanded form and other aids) 5-A-6

R (25) find the least common multiple and greatest common factor of any two numbers through 100. 5-B-5

R (26) identify the order relation of fractions and mixed numbers with denominators up to 12. 3-A-5

R (27) write a given fraction as an equivalent fraction with both larger and smaller (where possible) denominators. ½ = 2/4 = 3/6 (stress: 1 = 1/1 = 2/2 = 3/3 = 4/4, etc. and 5 = 5/1, 6 = 6/1, etc.) 4-A-5

R (28) reduce a fraction to its lowest terms. (simplify) 4-A-5

R (29) convert mixed numbers to improper fractions and improper fractions to mixed numbers in lowest terms. 5-A-5

R (30) add and subtract proper fractions with like and unlike denominators. 3-A-5

R (31) add and subtract mixed numbers with like and unlike denominators, with and without regrouping. 4-A-6

E (32) multiply two or more proper fractions, using the short cut or cancellation method. 5-A-6

E (33) multiply two or more mixed numbers, using the short cut or cancellation method. 5-A-6

I (34) divide proper fractions and mixed numbers, using the short cut or cancellation method. 6-A-6

E (35) express names of numbers in various ways. (whole numbers, fractions, and decimals) 4-B-6

E (36) give the place value of every digit in any number from one-millionth to one hundred billion. 1-A-6

E (37) read and write decimal fractions through millionths. 5-A-6

E (38) convert a number in fractional form to a number in decimal form, and vice versa. (only fractions which are equivalent to a terminating decimal) 4-A-7

I (39) change a fraction to a decimal when the result is a repeating decimal and correctly indicate the repeating part. 6-A-8

E (40) add and subtract decimal fractions. (stress subtraction problems in which the subtrahend has more digits after the decimal point than minuend) 5-A-6

I (41) multiply a whole number and a decimal fraction. 6-A-6

I (42) multiply two decimal fractions. 6-A-7

I (43) divide a decimal fraction by a whole number. (no remainders) 6-A-6

I (44) divide using decimals as divisors. (annexing zeroes only in order to move decimal point) 6-A-7

E (45) multiply and divide by powers of 10, using decimal point shifting method. 4-A-7

I (46) determine which zeroes in an answer may be omitted without changing the answer. 6-A-7

I (47) equate ratios to fractions and fractions to ratios. 6-A-6

I (48) recognize a proportion as a comparison equating two ratios. 6-A-7

I (49) find the missing part of a proportion. 6-A-7

I (50) change a ratio or a fraction with a denominator of 100 to a percent. 6-A-6

I (51) convert decimals to percents and percents to decimals. 6-A-6

I (52) convert fractions to percents and percents to fractions. 6-A-7

I (53) find a given percent of a number or what percent one number is of another. 6-A-7

R (54) select the appropriate unit to measure common objects. (mi., yd., pt., in., km, m, cm, mm, ton, lb., oz., kg, g, gal., qt., pt., oz., hl, l, ml, metric ton) 2-A-5

R (55) measure length to nearest yd., ft., in., ½ in., ¼ in., 1/8 in., 1/16 in., cm, and mm. 1-A-5

R (56) measure volume to the nearest gal., ½ gal., qt., ½ qt., pt., ½ pt., oz., l, ½ l, ¼ l, l, ml. 3-A-5

R (57) measure weight to the nearest lb., oz., kg, g. 3-A-5

R (58) convert one unit to another **within** the U.S. Customary System and convert one unit to another **within** the Metric System. (stress use of prefixes kilo, hecto, deka, deci, centi, milli, and their relative values) 3-A-5

R (59) estimate (guess) length, weight, volume, of common objects. (this skill needs to be taught, but may **never** be mastered) 3-B

R (60) determine temperature to the nearest degree using Fahrenheit and Celsius scales. 3-B-6

R (61) relate activities and comfort levels to thermometer readings. 3-B-6

I (62) determine the time in any time zone when given a time in one zone **and** find time differences between zones. 6-B-6

R (63) convert from small to large and large to small time units, including seconds, minutes, hours, days, weeks, months, years, decade, centuries. 4-A-5

E (64) identify and name points, lines, line segments, rays, angles and their parts, right triangles, equilateral triangles, squares, rectangles, circles and their parts, open and closed curves, cubes, pyramids, prisms, spheres, cylinders, polygons, hexagons, quadrilaterals, parallelograms, trapezoids, rhombuses. 1-B-6

E (65) state the relation between points and geometric figures. (inside of, parallel to, perpendicular to, intersecting, stretched, shrunk, adjacent to) 4-B-6

E (66) identify congruent figures, even though they may have been slid, flipped, and turned. 4-C

R (67) measure any angle up to 180° using a protractor. 5-B-5

I (68) determine **congruent** angles by using a protractor. 6-B-6

E (69) find the perimeter of any figure. (use formula for square and rectangle $P = 4s$, and $P = 2l + 2w$) 4-B-6

I (70) find the circumference of a circle using the formula. ($C = \pi d$, $C = 2\pi r$) 6-B-7

E (71) find the area of squares, rectangles, circles, parallelogram, triangles, in conventional units, using formulas. ($A = lw$, $A = s^2$, $A = \pi r^2$, $A = bh$, $A = \frac{1}{2}bh$ 4-B-7

E (72) find the volume of a rectangular prism, a cube and a cylinder by formula. ($V = lwh$, $V = s^3$, $V = \pi r^2 h$) 5-B-7

R (73) list the ordered pairs in a relation as determined by a given rule. 4-C

R (74) find the rule which relates the items in each ordered pair of a relation. (guess my rule). 4-C

R (75) identify the coordinates for a point on a grid, and locate the point on a grid which corresponds to a given number pair. 3-B-6

R (76) identify the union of 2 sets. 5-C

R (77) identify the intersection of 2 sets. 5-C

I (78) read a scale drawing and find actual lengths from scale drawings. (include maps) 6-C

I (79) produce a scale drawing, when given dimensions and scale. 6-C

R (80) find information using bar, picture, and circle graphs. 2-B-4

R (81) collect data, put it into charts or tables and represent the data in a graph. 4-B-4

R (82) make diagrams, tables, and graphs to represent relations. (sets of ordered pairs) 4-C

R (83) determine the possible outcomes of an experiment. (e.g. rolling a die, tossing a coin) 4-C

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R (84) specify which of a given set of outcomes is more likely, less likely, or equally likely to occur. 4-C

R (85) find the mean, median, mode and range of data. 5-C

E (86) read and write Roman numerals. 4-C

SEVENTH GRADE SKILLS

The pupil should be able to:

R (1) read and write numbers, in both Arabic symbols and words through one trillion. 1-A-6

E (2) give the place value of any digit in any numeral. 1-A-7

E (3) express names of numbers in various ways. (including whole numbers, fractions and decimals) 4-B-7

R (4) demonstrate a rapid recall of the basic arithmetic facts. 3-A-5*

R (5) properly use **zero** and **one** in the four basic operations. 1-A-4

R (6) recognize and properly use the symbols: $+, -, \div, \cdot, \sqrt{\ }, =, <, >, \$, \bullet, \pi, \%, \cup, \cap, \sqrt{\ }, \not=, ( )$. 1-A-6

R (7) add and subtract any whole numbers. 1-A-6

R (8) select the appropriate operations and apply them in the correct order to solve word problems. 1-A-8

R (9) check accuracy of answers to problems. (addition by *re-adding*, subtraction by addition, multiplication by interchanging multiplicand and multiplier, division with multiplication) 3-A-6

R (10) rewrite horizontal problems in vertical form with proper alignment. (stress decimal fraction problems) 3-A-6

R (11) multiply any whole numbers. 3-A-6

R (12) use exponents to show the powers of ten. 6-B-8

E (13) raise numbers to any whole number power (exponent). (stress 0^0 is undefined and any other number to the zero power is 1) 6-B-8

R (14) find the square root of any whole number which is a perfect square. 6-B-8

I (15) convert standard numerals to scientific notation and vice versa. 7-B-8

E (16) supply the missing number in a number sentence. 1-A-7

E (17) divide whole numbers. 3-A-7

R (18) properly use zero as a place holder in quotients. 3-A-6

R (19) supply the missing elements in a sequence or table and determine the rule indicated by the elements in a sequence or table. 2-C

R (20) properly use most efficient method (algorithm) to work addition, subtraction, multiplication, and division problems. (student now omits rows of zeroes, expanded form, and other aids) 5-A-6

R (21) recognize inverse operations. 2-A-5

R (22) express a division problem in three forms. ($2\sqrt{1}$, $1 \div 2$, $\frac{1}{2}$) 3-A-5

R (23) round any number to any specified place value. 3-A-7

R (24) estimate the answers to problems using rounded numbers, to determine if the answers are reasonable. 3-A-7

R (25) demonstrate a knowledge of the number relations in the commutative, associative, and distributive properties. (order and grouping) 2-C

R (26) identify the union of two sets. 5-C

R (27) identify the intersection of two sets. 5-C

E (28) determine if a number can be divided by 2, 3, 5, 4, 9, or 10 using divisibility tests. 5-B-7

E (29) give the prime factorization of a composite number in exponential form. ($12 = 2^2 \bullet 3$) 5-B-8

R (30) determine if a number is prime or composite. 5-B-8

R (31) find the least common multiple and greatest common factor of any two numbers through 100. 5-B-5

R (32) write a given fraction as an equivalent fraction with both larger and smaller (**when possible**) denominators. 4-A-5

R (33) reduce a fraction to its lowest terms. (simplify) 4-A-5

R (34) convert mixed numbers to improper fractions and improper fractions to mixed numbers in lowest terms. 4-A-5

R (35) add and subtract fractions and mixed numbers. 3-A-6

R (36) multiply any combination of fractions and mixed numbers using the short cut or cancellation method. 5-A-6

R (37) divide any combination of fractions and mixed numbers using the cancellation or short cut method. 6-A-6

E (38) identify the order relation of any two nonnegative numbers. 3-A-7

E (39) read and write decimal fractions. 5-A-7

R (40) convert a number in fractional form to a number in decimal form, and vice versa. (only fractions which are equivalent to a terminating decimal) 4-A-7

R (41) change a fraction to a decimal when the result is a repeating decimal and correctly indicate the repeating part. 6-A-8

R (42) add and subtract decimal fractions. (stress subtraction problems in which the subtrahend has more digits after decimal point than minuend) 5-A-6

R (43) multiply a whole number by a decimal fraction and multiply two decimal fractions. 6-A-7

R (44) divide using decimal fractions in any combination. 6-A-7

R (45) multiply and divide by powers of 10, using decimal point shifting method. 4-A-7

R (46) determine which zeroes in an answer may be omitted without changing the answer. 6-A-7

I (47) give the additive inverse (opposite to) any integer. 7-B-8

E (48) assign integers (positive, negative, zero) to points on a number line. 1-A-8

I (49) compare integers using $<$ and $>$. 7-B-8

I (50) add integers. 7-B-8

I (51) subtract integers. 7-B-8

I (52) multiply integers. 7-B-8

I (53) divide integers. 7-B-8

R (54) equate ratios to fractions and fractions to ratios. 6-A-6

R (55) recognize a proportion as a comparison equating two ratios. 6-A-7

R (56) find the missing part of a proportion. 6-A-7

R (57) change a ratio or fraction with a denominator of 100 to a percent. 6-A-6

R (58) convert fractions, decimals and percents from one form to any of the others. 6-A-7

E (59) solve percent problems using the basic formula $P = rb$. 6-A-8

I (60) find simple interest using the formula $I = prt$ 7-A-8

R (61) select the appropriate unit to measure common objects. (mi., yd., pt., in., km, m, cm, mm, ton. lb., oz., metric ton, kg, g, gal., qt., pt., kl, l, ml) 2-A-5

R (62) measure length to nearest yd., ft., in., ½ in., ¼ in., 1/8 in., 1/16 in., m, cm, and mm. 1-A-5

R (63) measure volume to the nearest gal., ½ gal., qt., ½ qt., pt., ½ pt., oz., liter, ½ liter, ¼ liter, ml. 3-A-5

R (64) measure weight to the nearest oz., lb., kg, g. 3-A-5

R (65) estimate (guess) lengths, weight, volume, of common objects. (this skill needs to be taught, but may never be mastered) 3-B

R (66) determine temperature to the nearest degree using Fahrenheit and Celsius scale and relate these to activities or comfort levels. 3-A-7

R (67) convert one unit to another **within** the U.S. Customary System and convert from one unit to another **within** the Metric System. (stress use of prefixes kilo, hecto, deka, deci, centi, milli, and their relative values) 3-A-5

I (68) convert the following U.S. Customary units to metric units and vice versa:
in-cm oz-g
yd-m lb-kg
mi-km qt-l 7-B-8

R (69) determine the time in any time zone when given a time in one zone **and** find the time differences between zones. 6-B-6

R (70) convert from large to small and small to large time units. (seconds, minutes, hours, days, weeks, months, years, decades, centuries) 4-A-5

R (71) identify and name points, lines, line segments, rays, angles and their parts, kind of angles, triangles and their parts, right angles, right triangles, equilateral triangles, squares, rectangles, circles and their parts, open and closed curves, cubes, pyramids, prisms, spheres, cylinders, polygons, etc... 1-B-6

R (72) state the relation between points and geometric figures, or between geometric figures. (inside of, outside of, parallel to, perpendicular to, intersecting, stretched, shrunk, adjacent to) 4-B-6

R (73) identify congruent figures even though they may have been slid, flipped, and turned. 4-C

R (74) measure any angle up to 180° using a protractor. 5-B-5

R (75) determine congruent angles by using a protractor. 6-B-6

E (76) find the perimeter of any figure. (use formulas for square, rectangles, and triangle. ($P = 4s$, $P = 2l$ $2w$, $P = S_1 + S_2 + S_3$) 4-A-7

R (77) find the circumference of a circle using formulas. ($C = \pi d$ or $C = 2\pi r$; $D = 2r$) 6-A-7

R (78) find the area of squares, rectangles, circles, parallelograms, triangles in conventional units using formulas. $A = s^2$, $A = lw$, $A = \pi r^2$, $A = bh$, $A = \frac{1}{2}bh$. 4-A-7

I (79) find surface areas of rectangular prisms, cylinders, and pyramids. 7-B-8

E (80) find the volume of rectangular prisms, cubes, cylinders and triangular prisms. ($V = lwh$, $V = s^3$, $V = \pi r^2 h$, $V = \frac{1}{2}lwh$) 5-A-7

I (81) construct geometric figures using a straightedge and compass. 7-C

R (82) list the ordered pairs in a relation as determined by a given rule. 4-C

R (83) find the rule which relates the items in each ordered pair of a relation. (guess my rule) 4-C

E (84) identify the coordinates for a point on a grid, and locate the point on a grid, which corresponds to a given number pair. 3-B-7

R (85) read a scale drawing and find actual lengths from scale drawings. (include maps) 6-C

R (86) produce a scale drawing given dimensions and a scale. 6-C

R (87) find information using bar, picture, and circle graphs. 2-B-4

R (88) collect data, put it into charts or tables, and present it in a graph. 4-B-4

R (89) make diagrams, tables, and graphs to represent relations. (set of ordered pairs) 4-C

R (90) determine the possible outcomes of an experiment. (rolling a die, tossing a coin, etc.) 4-C

R (91) specify which of a given set of outcomes is more likely, less likely or equally likely to occur. 4-C

I (92) specify the probability of a given event (outcome) 7-C

R (93) find the mean, median, mode and range of data 5-C

R (94) read and write Roman numerals. 4-C

EIGHTH GRADE SKILLS

The pupil should be able to:

R (1) read and write numbers in both Arabic symbols and words through one trillion. 1-A-6

R (2) give the place value of any digit in any numeral. 1-A-7

R (3) express names of numbers in various ways. (include whole numbers, fractions and decimals) 4-B-7

R (4) demonstrate a rapid recall of the basic arithmetic facts. 3-A-5*

R (5) add, subtract, multiply, and divide whole numbers. 1-A-7

R (6) properly use **zero** and **one** in the four basic operations. 1-A-4

R (7) properly use **zero** as a place holder in quotients. 3-A-6

R (8) properly use the most efficient method (algorithm) to work addition, subtraction, multiplication and division problems. (student now omits rows of zeroes, expanded form and other aids) 5-A-6

R (9) select the appropriate operations and apply them in the correct order to solve word problems. 1-A-8

E (10) check accuracy of answers to problems. (addition by re-adding, subtraction by addition, multiplication by interchanging multiplicand and multiplier, and division by multiplication). 3-A-6

R (11) recognize inverse operations. 2-A-4

R (12) express a division problem in 3 forms: ($2\overline{)1}$; $1 \div 2$, $\frac{1}{2}$). 3-A-5

E (13) recognize and properly use the symbols: $+$, $-$, $\cdot$, $\div$, $\sim$, $=$, $<$, $>$, \$, ¢, π, $\bullet$, %, $\cup$, $\cap$, $\sqrt{\ }$, $|x|$, ., ( ). 1-A-8

R (14) rewrite horizontal problems in vertical form with proper alignment. (Stress decimal fraction problems) 3-A-6

E (15) supply the missing number in a sentence. 1-A-8

R (16) raise numbers to any whole number power (exponents). (stress 0^0 is undefined and any other number to **zero** power is **one**). 6-B-8

I (17) rewrite **ten** to a negative exponent as **one** over **ten** to a positive exponent, a fraction, and a decimal. ($10^{-3} = 1/10^3 = 1/1000 = .001$) 8-B-8

E (18) write any base **ten** place value in exponential form. 7-B-8

E (19) convert any standard numeral to scientific notation and vice versa. 7-B-8

E (20) compute the square root of a nonnegative integer using the estimation method. 6-B-8

R (21) supply the missing elements in a sequence or table and determine the rule indicated by the elements in a sequence or table. 2-C

R (22) round any number to any specified value. 3-A-7

R (23) estimate the answers to problems using the rounded numbers to determine if the answer is reasonable. 3-A-7

R (24) demonstrate a knowledge of the number relations in the commutative, associative, and distributive properties. (order and grouping) 2-C

R (25) identify the intersection of two sets and union of two sets. 5-C

R (26) determine if a number can be divided by 2, 3, 4, 5, 9 or 10 using divisibility tests. 5-B-7

R (27) determine if a number is prime or composite. 5-B-8

R (28) give the prime factorization of a composite number in exponential form. ($12 = 2^2 \cdot 3$) 5-B-8

E (29) find the least common multiple and greatest common factor of 2, 3, or 4 numbers. 5-B-8

R (30) write a given fraction as an equivalent fraction with both larger and smaller denominators, when possible. 4-A-5

R (31) reduce fractions to lowest terms (simplify 4-A-5

R (32) convert mixed numbers to improper fractions, and improper fractions to mixed numbers in lowest terms. 4-A-5

R (33) add, subtract, multiply and divide fractions and mixed numbers. 3-A-6

R (34) read and write decimal fractions. 5-A-6

R (35) convert a number in fractional form to a number in decimal form, and vice versa. (only fractions which are equivalent to a terminating decimal) 4-A-7

R (36) change a fraction to a decimal when the result is a repeating decimal and correctly indicate the repeating parts. 6-A-8

R (37) add, subtract, multiply, and divide decimal fractions. 5-A-7

R (38) multiply and divide by powers of 10 using decimal point shifting method. 4-A-7

R (39) determine which **zeroes** in an answer may be omitted without changing the answer. 6-A-7

R (40) give the additive inverse (opposite) of any integer. 7-B-8

R (41) assign integers (positive, negative, 0) to points on a number line. 1-A-8

E (42) identify the order relation of any set of nonnegative rational numbers. 3-A-8

R (43) compare integers using the symbols $<$ and $>$. 7-B-8

R (44) add, subtract, multiply and divide integers. 7-B-8

R (45) equate ratios to fractions and fractions to ratios. 6-A-6

R (46) recognize a proportion as a comparison equating two ratios. 6-A-7

R (47) find the missing part of a proportion. 6-A-7

R (48) change a ratio or fraction, with a denominator of 100, to a percent. 6-A-6

R (49) convert fractions, decimals and percents from one form to any of the others. 6-A-7

R (50) solve percent problems using the basic formula $P = rb$. 6-A-8

R (51) find simple interest using the formula $I = prt$. 7-A-8

I (52) determine the amount to be paid back when the amount of a loan, the rate and the time are known; the amount in a savings account when amount deposited, the rate and time on deposit are known. 8-A-8

R (53) select the appropriate unit to measure common objects. (mi., yd., ft., in., km, m, cm, mm, ton, lb., oz., metric ton, g, gal., qt., pt., kl, l, ml) 2-A-5

R (54) measure length, volume and weight using both metric and customary units. 1-A-5

R (55) estimate (guess) lengths, weights and volume of objects. (this skill needs to be taught but may **never** be mastered) 3-B

R (56) determine temperature to the nearest degree using Fahrenheit and Celsius scales and relate these to activities or comfort levels. 3-A-7

R (57) convert one unit to another **within** the U.S. Customary System and convert one unit to another **within** the Metric System. (stress use of prefixes, kilo, hecto, deka, deci, centi, milli, and their relative values) 3-A-5

R (58) convert the following customary units to metric units and vice versa: degrees F - degrees C. in-cm oz-g yd-m lb-kg mi-km qt-l 7-B-8

R (59) convert from large to small, and small to large time units including seconds, minutes, hours, days, weeks, months, years, decades and centuries. 4-A-5

R (60) identify and name points, lines, line segments, rays, open and closed curves. 1-B-4

E (61) identify, name and define angle and the various types of angles. (obtuse, acute, straight, complementary, supplementary, right) 4-B-8

E (62) identify, name and define triangle and types of triangles. (acute, obtuse, scalene, isosceles, equilateral, right) 1-B-8

R (63) identify, name and define a circle and its parts. (radius, diameter, center) 1-B-6

E (64) identify, name and define polygons and the various types of polygons. (triangle, square, rectangle, quadrila-

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teral, parallelogram, trapezoid, pentagon) 1-B-8

E (65) identify, name and define or explain cylinders, spheres, cubes, rectangular prisms, triangular prisms, cones and pyramids. 2-B-8

R (66) state the relation between points and geometric figures, or between geometric figures. (inside of, outside of, parallel to, perpendicular to, intersecting, stretched, shrunk, adjacent to) 4-B-6

R (67) identify congruent figures, even though they may have been flipped, turned and slid. 4-C

R (68) find the perimeter of any figure. 4-A-7

R (69) find the circumference of a circle using the formulas ($C = \pi d$, $C = 2\pi r$) 6-A-7

R (70) find the area of squares, rectangles, circles, parallelograms, triangles, and trapezoids in conventional units using formulas. ($A = s^2$, $A = lw$, $A = \pi r^2$, $A = bh$, $A = \frac{1}{2}bh$, $A = \frac{1}{2}(B + b)$ (h)) 4-A-8

R (71) find the surface area of rectangular prisms, cylinders, and pyramids. 7-B-8

E (72) find the volume of a rectangular prism, a cube, a cylinder, a triangular prism, a cone and a pyramid. ($V = lwh$, $V = s^3$, $V = \pi r^2 h$, $V = \frac{1}{3}\pi r^2 h$, $V = \frac{1}{2}lwh$, $V = \frac{1}{3}Bh$) 5-A-8

R (73) construct geometric figures using a straightedge and compass. 7-C

I (74) demonstrate the Pythagorean relationship and solve problems using it. ($a^2 + b^2 = c^2$) 8-C

R (75) list the ordered pairs in a relation as determined by a given rule. 4-C

R (76) find the rule which relates the items in each ordered pair of a relation. (guess my rule) 4-C

E (77) identify the coordinates for a point on a Cartesian coordinate system and locate the point on a Cartesian plane which corresponds to a given number pair. 3-B-7

R (78) read a scale drawing and find actual lengths from scale drawings. (include maps) 6-C

R (79) produce a scale drawing giving dimensions and a scale. 6-C

R (80) find information using bar, picture and circle graphs. 2-B-4

R (81) collect data, put it into charts or tables and represent it in a graph. 4-B-4

R (82) make diagrams, tables, and graphs to represent relations. (set of ordered pairs) 4-C

R (83) determine the possible outcomes of an experiment. (rolling dice, tossing a coin) 4-C

R (84) specify which of a given set of outcomes is more likely, less likely or equally likely to occur. 4 C

R (85) compute simple probabilities. 7-C

R (86) find range from raw data. 5-C

I (87) solve simple distance, rate, time problems using the formula $D = rt$. 8-A-8

I (88) find the absolute value of rational numbers. 8-C

I (89) make generalized statments using the terms "all", "some", or "none", and distinguish between assumption and consequence. 8-B-8

R (90) read and write Roman numerals. 4-C

Addition Facts

0	1	2	3	4	5	6	7	8	9	10
+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10
+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
1	2	3	4	5	6	7	8	9	10	11
0	1	2	3	4	5	6	7	8	9	10
+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
2	3	4	5	6	7	8	9	10	11	12
0	1	2	3	4	5	6	7	8	9	10
+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3
3	4	5	6	7	8	9	10	11	12	13
0	1	2	3	4	5	6	7	8	9	10
+4	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
4	5	6	7	8	9	10	11	12	13	14
0	1	2	3	4	5	6	7	8	9	10
+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5
5	6	7	8	9	10	11	12	13	14	15
0	1	2	3	4	5	6	7	8	9	10
+6	+6	+6	+6	+6	+6	+6	+6	+6	+6	+6
6	7	8	9	10	11	12	13	14	15	16
0	1	2	3	4	5	6	7	8	9	10
+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7
7	8	9	10	11	12	13	14	15	16	17
0	1	2	3	4	5	6	7	8	9	10
+8	+8	+8	+8	+8	+8	+8	+8	+8	+8	+8
8	9	10	11	12	13	14	15	16	17	18
0	1	2	3	4	5	6	7	8	9	10
+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9
9	10	11	12	13	14	15	16	17	18	19
0	1	2	3	4	5	6	7	8	9	10
+10	+10	+10	+10	+10	+10	+10	+10	+10	+10	+10
10	11	12	13	14	15	16	17	18	19	20

Subtraction Facts

0	1	2	3	4	5	6	7	8	9	10
-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
0	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
0	1	2	3	4	5	6	7	8	9	10
2	3	4	5	6	7	8	9	10	11	12
-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
0	1	2	3	4	5	6	7	8	9	10
3	4	5	6	7	8	9	10	11	12	13
-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
0	1	2	3	4	5	6	7	8	9	10
4	5	6	7	8	9	10	11	12	13	14
-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
0	1	2	3	4	5	6	7	8	9	10
5	6	7	8	9	10	11	12	13	14	15
-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
0	1	2	3	4	5	6	7	8	9	10
6	7	8	9	10	11	12	13	14	15	16
-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
0	1	2	3	4	5	6	7	8	9	10
7	8	9	10	11	12	13	14	15	16	17
-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
0	1	2	3	4	5	6	7	8	9	10
8	9	10	11	12	13	14	15	16	17	18
-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
0	1	2	3	4	5	6	7	8	9	10
9	10	11	12	13	14	15	16	17	18	19
-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9
0	1	2	3	4	5	6	7	8	9	10
10	11	12	13	14	15	16	17	18	19	20
-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
0	1	2	3	4	5	6	7	8	9	10

Multiplication Facts

0	1	2	3	4	5	6	7	8	9	10
x0	x0	x0	x0	x0	x0	x0	x0	x0	x0	x0
0	0	0	0	0	0	0	0	0	0	0
0	1	2	3	4	5	6	7	8	9	10
x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
0	1	2	3	4	5	6	7	8	9	10
0	1	2	3	4	5	6	7	8	9	10
x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2
0	2	4	6	8	10	12	14	16	18	20
0	1	2	3	4	5	6	7	8	9	10
x3	x3	x3	x3	x3	x3	x3	x3	x3	x3	x3
0	3	6	9	12	15	18	21	24	27	30
0	1	2	3	4	5	6	7	8	9	10
x4	x4	x4	x4	x4	x4	x4	x4	x4	x4	x4
0	4	8	12	16	20	24	28	32	36	40
0	1	2	3	4	5	6	7	8	9	10
x5	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5
0	5	10	15	20	25	30	35	40	45	50
0	1	2	3	4	5	6	7	8	9	10
x6	x6	x6	x6	x6	x6	x6	x6	x6	x6	x6
0	6	12	18	24	30	36	42	48	54	60
0	1	2	3	4	5	6	7	8	9	10
x7	x7	x7	x7	x7	x7	x7	x7	x7	x7	x7
0	7	14	21	28	35	42	49	56	63	70
0	1	2	3	4	5	6	7	8	9	10
x8	x8	x8	x8	x8	x8	x8	x8	x8	x8	x8
0	8	16	24	32	40	48	56	64	72	80
0	1	2	3	4	5	6	7	8	9	10
x9	x9	x9	x9	x9	x9	x9	x9	x9	x9	x9
0	9	18	27	36	45	54	63	72	81	90
0	1	2	3	4	5	6	7	8	9	10
x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
0	10	20	30	40	50	60	70	80	90	100

Division Facts

$1\overline{)1}^{1}$	$1\overline{)2}^{2}$	$1\overline{)3}^{3}$	$1\overline{)4}^{4}$	$1\overline{)5}^{5}$	$1\overline{)6}^{6}$	$1\overline{)7}^{7}$	$1\overline{)8}^{8}$	$1\overline{)9}^{9}$	$1\overline{)10}^{10}$
$2\overline{)2}^{1}$	$2\overline{)4}^{2}$	$2\overline{)6}^{3}$	$2\overline{)8}^{4}$	$2\overline{)10}^{5}$	$2\overline{)12}^{6}$	$2\overline{)14}^{7}$	$2\overline{)16}^{8}$	$2\overline{)18}^{9}$	$2\overline{)20}^{10}$
$3\overline{)3}^{1}$	$3\overline{)6}^{2}$	$3\overline{)9}^{3}$	$3\overline{)12}^{4}$	$3\overline{)15}^{5}$	$3\overline{)18}^{6}$	$3\overline{)21}^{7}$	$3\overline{)24}^{8}$	$3\overline{)27}^{9}$	$3\overline{)30}^{10}$
$4\overline{)4}^{1}$	$4\overline{)8}^{2}$	$4\overline{)12}^{3}$	$4\overline{)16}^{4}$	$4\overline{)20}^{5}$	$4\overline{)24}^{6}$	$4\overline{)28}^{7}$	$4\overline{)32}^{8}$	$4\overline{)36}^{9}$	$4\overline{)40}^{10}$
$5\overline{)5}^{1}$	$5\overline{)10}^{2}$	$5\overline{)15}^{3}$	$5\overline{)20}^{4}$	$5\overline{)25}^{5}$	$5\overline{)30}^{6}$	$5\overline{)35}^{7}$	$5\overline{)40}^{8}$	$5\overline{)45}^{9}$	$5\overline{)50}^{10}$
$6\overline{)6}^{1}$	$6\overline{)12}^{2}$	$6\overline{)18}^{3}$	$6\overline{)24}^{4}$	$6\overline{)30}^{5}$	$6\overline{)36}^{6}$	$6\overline{)42}^{7}$	$6\overline{)48}^{8}$	$6\overline{)54}^{9}$	$6\overline{)60}^{10}$
$7\overline{)7}^{1}$	$7\overline{)14}^{2}$	$7\overline{)21}^{3}$	$7\overline{)28}^{4}$	$7\overline{)35}^{5}$	$7\overline{)42}^{6}$	$7\overline{)49}^{7}$	$7\overline{)56}^{8}$	$7\overline{)63}^{9}$	$7\overline{)70}^{10}$
$8\overline{)8}^{1}$	$8\overline{)16}^{2}$	$8\overline{)24}^{3}$	$8\overline{)32}^{4}$	$8\overline{)40}^{5}$	$8\overline{)48}^{6}$	$8\overline{)56}^{7}$	$8\overline{)64}^{8}$	$8\overline{)72}^{9}$	$8\overline{)80}^{10}$
$9\overline{)9}^{1}$	$9\overline{)18}^{2}$	$9\overline{)27}^{3}$	$9\overline{)36}^{4}$	$9\overline{)45}^{5}$	$9\overline{)54}^{6}$	$9\overline{)63}^{7}$	$9\overline{)72}^{8}$	$9\overline{)81}^{9}$	$9\overline{)90}^{10}$
$10\overline{)10}^{1}$	$10\overline{)20}^{2}$	$10\overline{)30}^{3}$	$10\overline{)40}^{4}$	$10\overline{)50}^{5}$	$10\overline{)60}^{6}$	$10\overline{)70}^{7}$	$10\overline{)80}^{8}$	$10\overline{)90}^{9}$	$10\overline{)100}^{10}$